DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED ON BEHALF OF THE U.S. BUREAU OF LAND MANAGEMENT

MISCELLANEOUS INVESTIGATIONS SERIES
MARINE GEOLOGY ATLAS
BEEVILLE QUADRANGLE, TEXAS
MAP I-1288-A

DISCUSSION

This map is one of a set of six environmental geologic maps for the Beeville 1° × 2° quadrangle, Texas. The six maps constitute a marine geologic atlas that has been designed to integrate a variety of environmental data and to show the fundamental geologic and associated processes involved in the building and evolution of the Continental Shelf.

The topical maps interrelate data on water circulation and sedimentation, trace metals, geochemistry, biogeology, sea-level change, and deformational movements within the Continental Shelf, including folding, faulting, diapirism, and slumping. The types of data portrayed on individual maps are those that have a cause-and-effect interrelationship in the environment. For example, amounts of trace elements and numbers of invertebrates that live in bottom sediments are both closely related to the grain size or texture of the sediments. Likewise, the sediment-deposition rate is dependent on the speed and direction of oceanographic currents (both surface and subsurface). The maps are organized to emphasize the interactions of processes as a function of time and to demonstrate the long-term effects of the related processes. Thus, map A covers the most fundamental aspect of marine geology, the rate at which sediment introduced to the ocean is spread by its transporting medium, water. The rate of spreading varies from minutes and hours to seasons and years; therefore, yearly rates of sediment deposition are related to the movement of water averaged in both yearly and seasonal increments. Map B shows trace-metal data for surficial bottom sediments. Map C portrays somewhat longer term cumulative effects of the varying hydraulic regimes, as revealed by the grain size of surficial bottom sediments (sampled to a depth of 6 cm), and the variations in the texture and type of sediment deposited over hundreds or thousands of years, as revealed by gravity cores that penetrated to depths from a few tens of centimeters to 2 m. The amount of sediment deposited over the Continental Shelf and the extent and magnitude of faulting since the last low stand of sea level, about 18,000 years ago, are shown on map D. Map E shows paleogeography of the shelf when it was exposed as land. The cumulative deformation caused by the interaction of sediment loading, diapirism, and sea-level changes over the past several hundred thousand years are shown on map F.

The maps of the Beeville 1° × 2° quadrangle include the Federal lease block grid and bathymetry, so that the data and interpretations can be easily tied to a specific legal geographic entity within the region at a scale large enough to permit reasonable accuracy of location. These maps provide a summary state-of-the-art inventory of the segment of the Continental Shelf located in the Beeville 1° × 2° quadrangle that can be used in planning specific site studies as well as more detailed topical investigations.

EXPLANATION

DRIFTER RELEASE POINT AND VECTOR—Direction and velocity in km/day for each station are the averages of all drops for all years of study. Drifters used were weighted bottles on the surface and drogues on the bottom, dropped at the station from an aircraft. Where the graph could not be centered on the drifter station, it is leadered into the actual station locality. Seasonal averages for all years are shown on figure 1

Surface
Bottom
} Each division on the bar represent one km.

RATE OF SEDIMENTATION IN MM/YR—Approximately located. Contour interval, 1mm/yr

- < 2.00 mm/yr
- 2.00-3.00 mm/yr
- 3.00-4.00 mm/yr
- > 4.00 mm/yr

1.24 CORE LOCALITY USED FOR DETERMINING RATE OF SEDIMENTATION—Number indicates average rate of sedimentation in mm/yr during the past 100 to 150 years using the isotope ^{210}Pb as the dating agent

T-4 SAMPLE STATION—Locality of station where Smith-MacIntyre grab samples were taken for seasonal monitoring of changes in grain size of surficial bottom sediments (fig. 2). Roman numeral is transect designation; arabic number is station designation

- PIPELINE LANDFALL
- GAS PROCESSING PLANT
- PETROCHEMICAL PLANT
- PORT CAPABLE OF ACCOMMODATING CREWBOATS AND WORKBOATS
- OIL OR GAS FIELD

PLATFORMS
- Smaller than 2500 sq ft
- Larger than 2500 sq ft

- SHIPWRECK
- ARTIFICIAL FISHING REEF

SUPPLEMENTARY READINGS

Berryhill, H. L., Jr., editor, 1977a, Environmental studies, south Texas outer continental shelf, 1975—An atlas and integrated summary: U. S. Geological Survey report to the U. S. Bureau of Land Management, contract 08550-MU 5-20, 303 p.

_____1977b, Environmental studies, south Texas outer continental shelf, 1976—Geology: Reston, Va., U.S. Geological Survey, available only from U. S. Department of Commerce, National Technical Information Service, Springfield, VA 22161, as Report PB 277-337/AS, 626 p.

_____1978, Environmental studies, south Texas outer continental shelf, 1977—Geology: Reston, Va., U. S. Geological Survey, available only from U. S. Department of Commerce, National Technical Information Service, Springfield, VA 22161, as Report PB 289-144/AS, 306 p.

Berryhill, H. L., Jr., Shideler, G. L., Holmes, C. W., Hill, G. W., Barnes, S. S., and Martin, R. G., Jr., 1976, Environmental studies of the south Texas outer continental shelf, 1975—Geology—Part I, Geologic description and interpretation: Reston, Va., U. S. Geological Survey, available only from U. S. Department of Commerce, National Technical Information Service, Springfield, VA 22161, as Report PB 251341, 273 p.

Goldberg, E. D., 1963, Geochronology with Pb-210, *in* Radioactive dating: International Atomic Energy Agency, Contribution 1510, p. 121-131.

Hill, G. W., and Garrison, L. E., 1978, Maps showing seasonal drift patterns along the Texas coast, 1970-1975: U. S. Geological Survey, Miscellaneous Field Studies Map MF-982, various scales, 2 sheets.

Holmes, C. W., and Martin, E. A., 1977, Rates of sedimentation, *in* Berryhill, H. L., Jr., editor, Environmental studies, south Texas outer continental shelf, 1976—Geology: Reston, Va., U.S. Geological Survey, available only from U.S. Department of Commerce, National Technical Information Service, Springfield, VA 22161, as Report PB 277-337/AS, 626 p.

Koide, Minoru, Bruland, K. W., Goldberg, E.D., 1973, $^{228}Th/^{232}Th$ and ^{210}Pb geochronologies in marine and lake sediments: Geochimica et Cosmochimica Acta, v. 37, p. 1171-1187.

Moore, D. G., 1955, Rate of deposition shown by relative abundance of Foraminifera: American Association of Petroleum Geologists Bulletin, v. 39, no. 8, p. 1594-1600.

Shideler, G. L., 1977, Suspended sediments—physical characteristics, *in* Berryhill, H. L., Jr., editor, Environmental studies, south Texas outer continental shelf, 1976—Geology: Reton, Va., U. S. Geological Survey, available only from U.S. Department of Commerce, National Technical Information Service, Springfield, VA, 22161, as Report PB 277-337/AS, 626 p.

INTERIOR—GEOLOGICAL SURVEY, RESTON VA.—1981—GS0220

Base from U.S. National Ocean Survey. Base map information including bathymetry, compiled by the U.S. National Ocean Survey from NOS hydrographic surveys supplemented by hydrographic information from other sources. Bathymetric contour intervals: 10 meters to the 200-meter depth, supplemented by 2-meter intervals, thence 50 meters to maximum depth.
Datum: MLW.
Universal Transverse Mercator Grid, Zone 14; 10,000-meter ticks (|) are shown on the neatline.

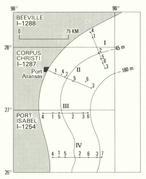
EVALUATION OF BATHYMETRIC SURVEY ACCURACY

SURVEY NUMBER	SURVEY DATE	SCALE	SURVEY LINE SPACING (NAUT. MILES)	HORIZONTAL LINE SPACING (METERS)
H-5693	1934-35	1:20,000	03-12	20-40
H-5856	1935	1:20,000	03-10	20-40
H-5857	1935	1:20,000	05-10	20-40
H-5864	1935	1:10,000	03-25	15-30
H-5865	1935	1:20,000	03-10	20-40
H-5866	1935	1:20,000	04-26	20-40
H-5875	1935	1:20,000	03-10	20-40
H-5877	1935	1:20,000	04-16	20-40
H-5916	1935	1:20,000	05-15	20-40
H-6389	1938	1:20,000	07-15	20-40
H-6390	1938	1:20,000	10-18	20-50
H-6391	1938	1:20,000	10-20	20-50
H-6392	1938	1:20,000	07-18	20-50
H-6393	1938	1:20,000	07-15	20-50
H-6394	1938	1:20,000	07-15	20-40
H-6400	1938	1:40,000	18-73	20-100
H-6401	1938	1:40,000	22-80	30-100
H-6402	1938	1:80,000	10-40	40-200
H-6405	1938	1:80,000	10-2.0	40-200

TRANSVERSE MERCATOR PROJECTION
Scale 1:250,000

5 0 5 10 15 20 Statute Miles
5 0 5 10 15 20 25 30 Kilometers
5 0 5 10 15 Nautical Miles

Compiled by H. L. Berryhill, Jr. and A. R. Trippet in 1978. Scientific contributors include E. A. Martin, C. W. Holmes, C. A. Rice, G. L. Shideler, and C. E. Stelting

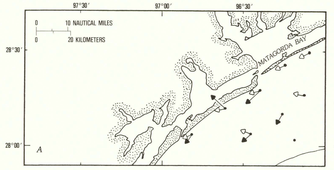


Index showing adjoining environmental geologic maps and general location of sample-station transects used in this series

MAP SHOWING WATER CIRCULATION AND RATES OF SEDIMENTATION IN THE BEEVILLE 1° × 2° QUADRANGLE, TEXAS

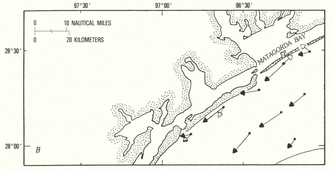
Compiled by
Henry L. Berryhill, Jr. and Anita R. Trippet

1981



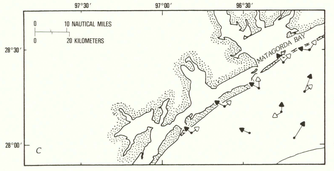
WINTER
Release dates
January 16, 1970
December 6,1971
January 18, 1973
January 23, 1974
January 15, 1975
1972, no data

EXPLANATION
- DRIFTER RELEASE POINT AND VECTOR—Open arrow, bottom drifter; solid arrow, surface drifter
- RATE OF MOVEMENT—Length of line indicates about 5 km per day



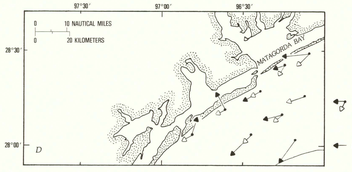
SPRING
Release dates
April 28, 1970
May 27, 1971
April 4, 1972
April 11, 1973
April 3, 1974
April 17, 1975

EXPLANATION
- DRIFTER RELEASE POINT AND VECTOR—Open arrow, bottom drifter; solid arrow, surface drifter
- RATE OF MOVEMENT—Length of line indicates about 5 km per day



SUMMER
Release dates
July 13, 1970
August 29, 1972
July 24, 1973
July 3, 1974
1971, 1975, no data

EXPLANATION
- DRIFTER RELEASE POINT AND VECTOR—Open arrow, bottom drifter; solid arrow, surface drifter
- RATE OF MOVEMENT—Length of line indicates about 5 km per day



FALL
Release dates
November 4, 1970
October 4, 1972
October 10, 1973
October 1, 1974
1971, 1975, no data

EXPLANATION
- DRIFTER RELEASE POINT AND VECTOR—Open arrow, bottom drifter; solid arrow, surface drifter
- RATE OF MOVEMENT—Length of line indicates about 5 km per day

Figure 1.—Seasonal averages for 1970-75 of sea drifter movement in the Beeville quadrangle, Texas. *A*, winter; *B*, spring; *C*, summer; and *D*, fall.

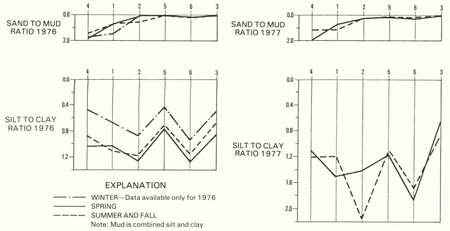


Figure 2.—Seasonal changes in size of sediment grains along transect I in the Beeville quadrangle, Texas, during 1976-77. "Transect I, stations 2, 5, 6, and 3 are shown on the Corpus Christi quadrangle to the south (I-1287 A).

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